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Mazdoor Kisan Shakti Sangathan

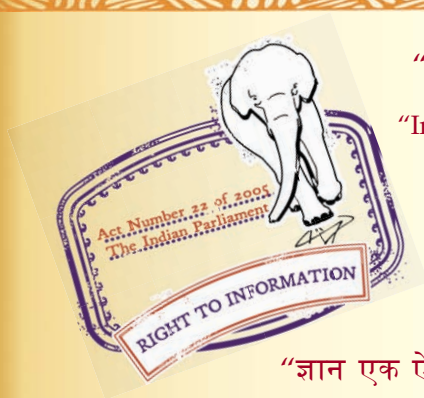
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

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“Step Out From the Old to the New”

IS 13093 (2002): Sheet Metal Body Repair Steel Hammers - General Requirements [PGD 6: Earth, Metal And Wood Working Hand Tools]



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Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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धातु चद्दर ढाँचे की मरम्मत के लिए इस्पात
के हथोड़े — सामान्य अपेक्षाएँ
(पहला पुनरीक्षण)

Indian Standard

SHEET METAL BODY REPAIR STEEL HAMMERS —
GENERAL REQUIREMENTS
(*First Revision*)

ICS 25.140.30

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Earth Working and Metalworking Tools Sectional Committee had been approved by the Basic and Production Engineering Division Council.

These type of hammers are generally used while working on sheet metal to remove dents with the help of dolly blocks. Maximum use of these hammers is in automotive industries and such industries where work is done on sheet metals. This standard gives a broad view of the hammers to the users. Test and other general requirements have been covered for the time being. Dimensions will be included later on after the data is collected from the manufacturers of the product.

This revision is undertaken to completely align the test setup with international practices and facilitate its easy implementation and certifiability.

While preparing this standard, assistance has been taken from ANSI B 173.5-1979 'Safety requirements for body repair hammers and dolly blocks', issued by the American National Standard Institute (ANSI).

Indian Standard

SHEET METAL BODY REPAIR STEEL HAMMERS — GENERAL REQUIREMENTS (*First Revision*)

1 SCOPE

This standard covers the general requirements for the sheet metal body repair steel hammers.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
620 : 1985	Wooden tool handles general requirements (<i>fourth revision</i>)
1586 : 2000	Method for Rockwell hardness test for metallic material (Scales A-B-C-D-E-F-G-H-K, 15N, 30N, 45N, 15T, 30T and 45T) (<i>third revision</i>)
1875 : 1992	Carbon steel billets, blooms, slabs and bars for forging (<i>fifth revision</i>)

3 DEFINITIONS

Definitions used in this standard are as given in 3.1 to 3.20. For nomenclature reference may be made to Fig. 1 also.

3.1 Bell

That portion of the hammerhead located between the neck and striking face.

3.2 Bumping

The act of restoring damaged sheet metal panels to their approximate original shape with body repair hammer or dolly block or both.

3.3 Chamfer

The angled flat surface or equivalent radius encircling the perimeter of the striking and struck faces and at the end of cross peins.

3.4 Cheek

The outside surface of the hammerhead on either side of the eye, located between the two necks.

3.5 Dinging

The act of removing dents, wrinkles, dimples, low waves and other minor imperfections from damaged sheet metal panels with the body repair hammer.

3.6 Eye

An opening or aperture in the hammerhead into which the handle is inserted.

3.7 Fender Bumper

A body repair hammer that has a struck face.

3.8 Handle

That portion which protrudes from the hammerhead and by which the hammer is held.

3.9 Neck

The portion of the hammerhead located between the bell and the eye or between the open and the eye or both.

3.10 Pein

The striking surface of the hammerhead located in front of the neck. The pein may have one of the following shapes:

- a) Wedge shaped (as in a cross pein or cross chisel),
- b) Cylindrical (as in a cylindrical cross pein), and
- c) Rounded (as in a ball-pein).

3.11 Pick

The elongated tapered portion of the hammerhead extending from the eye of the point.

3.12 Picking (or Pecking)

The act of raising a low spot or small dent from damaged sheet metal panels with the body repair hammer.

3.13 Point

The striking surface located at the end of the pick.

3.14 Shrinking

The act of contracting (or shrinking) stretched sheet metal by heating and upsetting the stretched metal

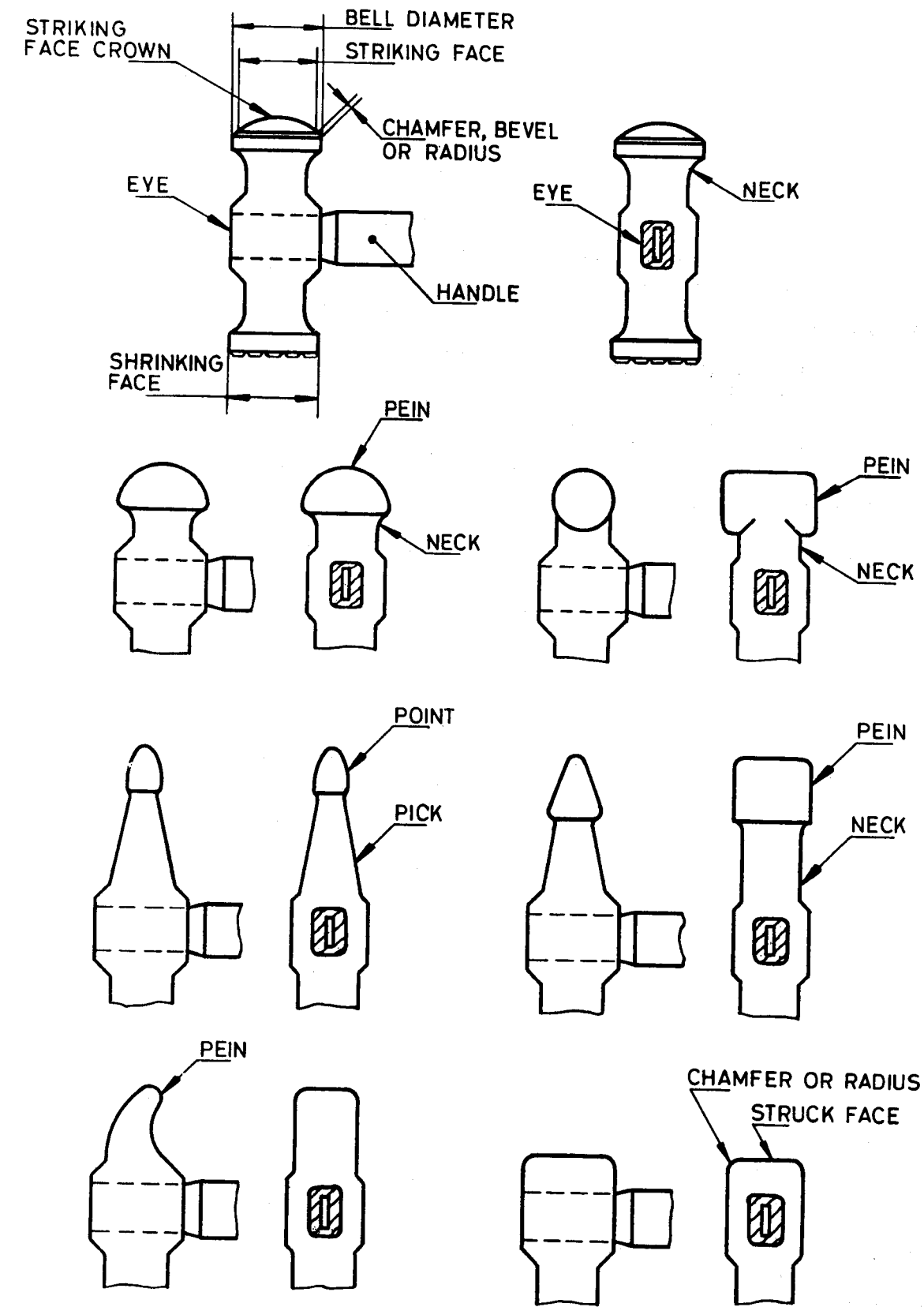


FIG. 1 NOMENCLATURE FOR BODY REPAIR HAMMER

into the heated spot with the body repair hammer.

3.15 Shrinking Face

The striking surface, that is, normally serrated; it may be flat or crowned.

3.16 Striking Face

That portion of the hammerhead located in front of the bell and chamfer that contacts the sheet metal during use.

3.17 Striking Face Crown

The convex shape or radius of the striking face.

3.18 Striking Surface

Any surface of a hammerhead pein, or pick intended to contact the sheet metal during use.

3.19 Struck Face

That portion of the hammerhead, exclusive of the chamfer, that is, located opposite a striking face and is intended to be struck with a striking tool during use.

3.20 Wedge

Taper piece of steel or wood for securing firmly the handle into the hammerhead.

4 MATERIAL

4.1 Body repair hammerheads shall be made from any suitable fine grain, hot rolled steels meeting the requirements laid down in 5 and 8. One of the recommended steels is steel designation 45C8 of IS 1875.

4.2 Handles shall be made from any suitable wood conforming IS 620.

5 HARDNESS

5.1 The striking faces and pein ends of body repair hammerheads shall be hardened and tempered to a hardness of not less than 45 HRC or more than 60 HRC.

5.2 The hardness of the struck face of the fender bumper body repair hammerhead shall be between 35 HRC to 45 HRC.

6 GENERAL REQUIREMENTS

6.1 Body Repair Hammer Design

Body repair hammers are designed for striking against sheet metal panels during the repair of sheet metal body and fender sections. A body hammer shall consist of a hammerhead with one or more striking surfaces

and a handle, or of one striking surface and one struck face and a handle, as in a fender bumper.

6.1.1 The hammerhead striking surfaces may consist of, but are not limited to, any combination of the following styles, as shown in Fig. 2A to 2D :

- a) *Bumping, dinging, finishing face* — Has a smooth, flat, or crowned striking face. The cross-section of the bell may be round or polygonal.
- b) *Picking, pecking end* — Has a pointed or rounded tip called a point at the end of a round or polygonal pick. The axis of the pick may be straight or curved.
- c) *Shrinking face* — Has a serrated striking face, which may be flat or crowned. The cross-section at the bell may be round or polygonal.
- d) *Ball-pein end* — Has a smoothly contoured shape, that is, approximately hemispherical
- e) *Cylindrical cross-pein end* — Has a generally cylindrical shaped striking part whose axis is oriented approximately at a right angle to the axes of the hammerhead and handle.
- f) *Cross-pein, cross-chisel* — Has a wedge or chisel-shaped pein oriented at right angle to the axis of the handle.

6.1.2 The fender bumper has a striking surface and a struck face, as shown in Fig. 2E.

6.1.3 The bumping, dinging, finishing, and other striking faces shall be chamfered to avoid sharp corners.

6.1.4 Handles shall be of any design that can withstand the appropriate tests specified in 8.3, 8.4, 8.5 and 8.6.

6.1.5 The hammer shall be free of non-functional sharp edges, points, and surface roughness that could inflict personal injury on the user.

7 DESIGNATION

A steel metal body repair steel hammer of nominal mass 450g and ball-pein end shall be designated as:

Steel metal body repair steel hammer 450
Ball-pein IS 13093.

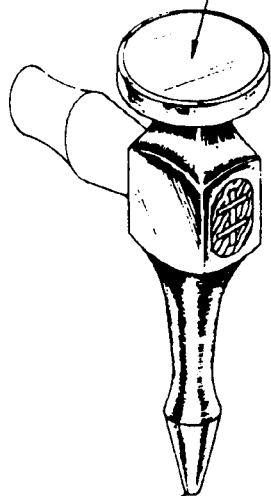
8 TESTS

Body repair hammers shall be tested and shall conform to the requirements of the tests specified in 8.1 to 8.6. Separate samples shall be used for each of the tests.

8.1 Hardness Determination Test

Hardness determination with respect to striking faces, peins and struck faces of body repair hammerheads

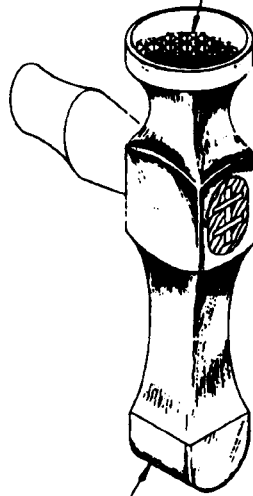
BUMPING, DINGING,
FINISHING FACE



PICKING, PECKING

2A

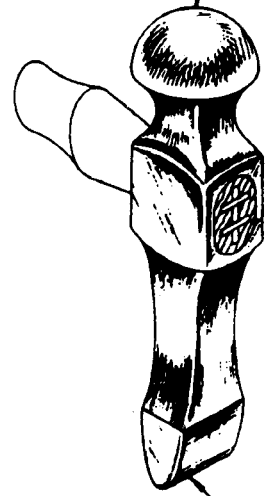
SHRINKING FACE



BUMPING, DINGING,
FINISHING FACE

2B

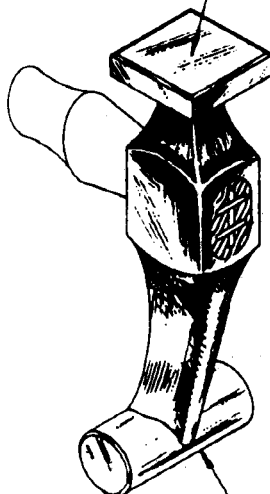
BALL PEIN



CROSS PEIN OR
CROSS CHISEL

2C

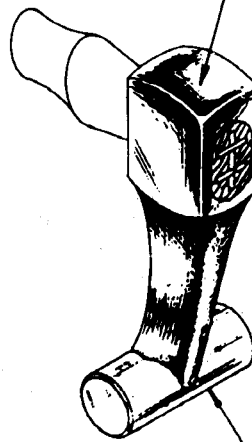
BUMPING, DINGING,
FINISHING FACE



CYLINDRICAL CROSS PEIN

2D

STRUCK FACE



CYLINDRICAL CROSS PEIN

2E

FIG. 2 BODY REPAIR HAMMER STRIKING AND STYLE

shall be made on a fixture tool or on a suitable mounted or unmounted specimen that has been cut from the tool using the wet abrasive or other equivalent method. The Rockwell hardness test shall be carried out as per IS 1586.

8.2 Tensile Force Test

A sample of body repair hammer shall be subjected to a preconditioning test as specified in 8.3, 8.4 or 8.5 using the following test set-up:

A rigidly supported steel bar of 152 mm minimum diameter and 76 mm minimum height and having a Rockwell hardness of 92 HRB to 105 HRB shall be used to support a 0.5 mm thick steel sheet metal panel that fully covers the steel bar (see Fig. 3). Following the pre-conditioning test, the hammerhead shall not separate from the handle when subjected to consecutive hard blows as shown in Fig. 3 (for other details refer 8.3 to 8.5).

8.3 Dinging, finishing, bumping, and ball-pein hammer ends shall withstand twenty swinging blows by continuous hand striking through a 90° arc by a man of average build (72 to 82 kg) without chipping, cracking, spalling or mushrooming of the striking face

or ball-pein. The hammer handle shall not splinter, break or loosen.

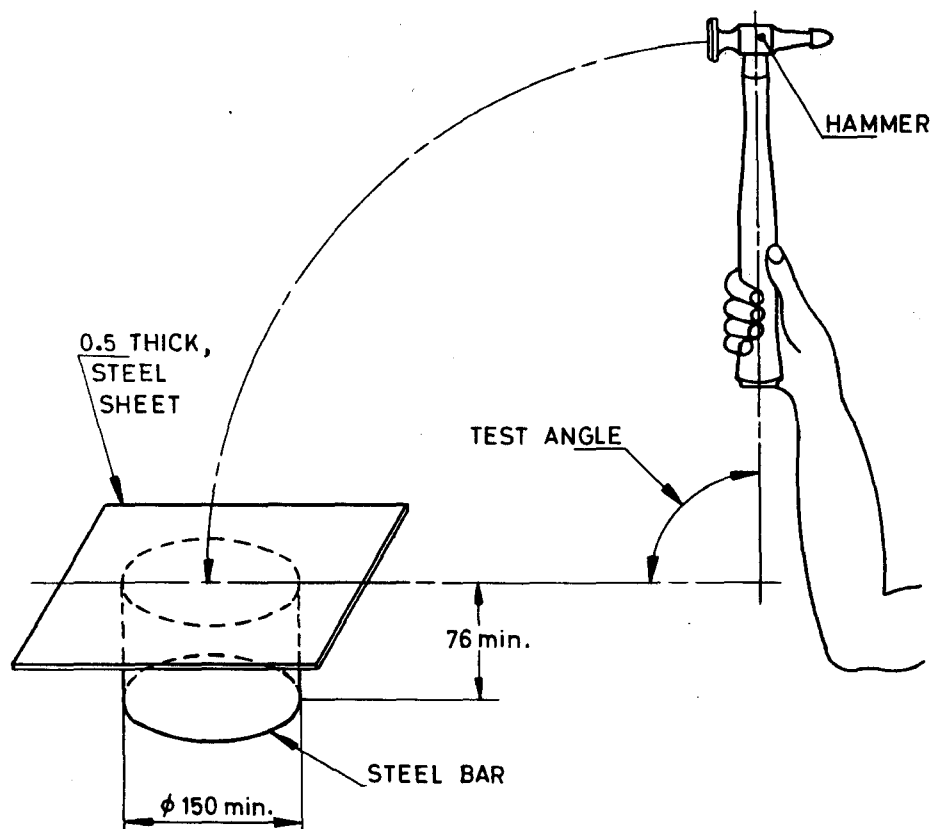
8.4 Pecking, cylindrical cross-pein, cross-chisel and shrinking hammer ends shall withstand twenty swinging blows by continuous hand striking through a 45° arc without chipping, cracking, spalling or mushrooming of the point, pein, or chisel ends. The hammer handle shall not splinter, break or loosen.

8.5 Fender bumper body repair hammers shall be subjected to a pre-conditioning test using the same test set-up as shown in Fig. 3. The cylindrical cross-pein shall be held against the sheet metal with the handle extending horizontally. The striking face of a 455 g ball-pein hammer shall be used to subject the struck face to 20 swinging blows by continuous hand striking through a 90° arc. The fender bumper hammerhead shall not chip, crack, spall or mushroom.

8.6 Static Force Test

Samples of the assembled body repair handles shall not break, loosen or otherwise fail when subjected to a static force of 111N when:

- The hammerhead is locked securely in the test fixture with the striking face down and



All dimensions in millimetres.

FIG. 3 BODY REPAIR HAMMER TEST SET-UP

the handle extended in a horizontal plane, and

- b) A static force of 111 N is applied vertically at a point on the handle measuring 250 mm from the hammerhead end of the handle.

9 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

9.1 Body repair hammers are special-purpose tools designed and intended only for use in the straightening, shaping, shrinking, picking and finishing of damaged sheet metal panels normally found on bodies and fenders of motor vehicles. They are intended to be used either separately or together for these repair procedures.

9.2 To avoid bodily injury, body repair hammers shall not be used to strike hard or hardened objects such as rocks, concrete, bricks, chisels, hatchets, axes, mother hammers or steel tools, or any object other than sheet metal panels.

9.3 The cheeks or necks of body repair hammers shall not be used for striking or Pounding.

9.4 Safety goggles or equivalent eye protection shall be worn by the user and all persons in the immediate area in which any striking tool is being used to avoid possible eye injury from flying objects.

9.5 Body repair hammerheads shall be inspected at

regular intervals and their use discontinued at the first sign of chipping, mushrooming, or cracking.

9.6 Handles shall be inspected at regular intervals and damaged handles shall be replaced. Replacements shall withstand the tests specified in **8.2** and **8.3**.

Handles shall be free of splinters or cracks and shall be kept tight in the head of the tool.

9.7 No part of the body repair hammerhead shall be ground, welded, re-heat-treated, or otherwise altered from the original condition as furnished by the manufacturer.

10 MARKING

Each hammer shall be clearly and indelibly marked with nominal mass style on hammer head striking face and indication of source of manufacture.

10.1 BIS Certification Marking

The product may also be marked with the Standard Mark.

10.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. BP 06 (0018).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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